

Biological Evaluation/Biological Assessment
For
Threatened, Endangered, and Sensitive (TES) Species
Clinch Wildlife Clearing Improvement Project
Scott, Lee, Wise and Dickenson Counties, Virginia
Clinch Ranger District
George Washington and Jefferson National Forests

Introduction

Forest Service Manual (FSM) Section 2672.41 requires a biological evaluation (BE) and/or biological assessment (BA) for all Forest Service planned, funded, executed, or permitted programs and activities. The objectives of this BE/BA are to: 1) ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native species or contribute to trends toward federal listing, 2) comply with the requirements of the Endangered Species Act (ESA) so that federal agencies do not jeopardize or adversely modify critical habitat (as defined in ESA) of federally listed species, and 3) provide a process and standard to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision-making process using the best available science.

The Clinch Ranger District supports known occurrences and suitable habitat for several TES species, all of which were considered in this analysis. This BE/BA documents the analysis of potential impacts of the proposed project to TES species and associated habitat. It also serves as biological input into the environmental analysis for project-level decision-making to ensure compliance with the ESA, National Environmental Policy Act (NEPA), and National Forest Management Act (NFMA).

Project Area and Effects Analysis Area

The geographic scope of this biological analysis for terrestrial plants and animals is the project area (areas to be treated). Based on the Biological Opinions of 2004 the geographic scope of the analysis for the Indiana bat is the entire Jefferson National Forest.

Hydrologic analysis was not conducted for this project due to the lack of significant ground disturbance.

Proposed Management Actions

The Forest Service is proposing to maintain existing wildlife clearings on the District by implementing the following actions:

- Mow or brush hog up to 60 acres annually. This is to be accomplished with a tractor or other approved non-chemical methods to remove brush and prevent tree encroachment.
- Disk and seed up to 15 acres annually to promote desired native plants and to maintain a beneficial herbaceous state.

- Prescribed burn up to 25 acres annually to promote desired native plants and to maintain a beneficial herbaceous state.

The appropriate treatment and location will be selected by professional judgment of a biologist or natural resource specialist based on the existing state of the clearings and occur on a rotational basis over the next ten years. Clearings may be retreated every two to three years over the next ten years to maintain the desired state.

Species Reviewed

Federally listed threatened and endangered species, species proposed for federal listing, and Southern Region sensitive species (TES) that may potentially be impacted by this project were examined using the following existing available information:

1. Reviewing the list of TES plant and animal species known, or likely to occur, on the George Washington and Jefferson National Forests, and their habitat preferences. This review included the current list of federal endangered, threatened, and proposed species for the Forest, the list generated by the U.S. Fish and Wildlife Service Information for Planning and Conservation (IPaC) screening tool for the project area dated February 4, 2021 and the current Southern Region Sensitive Species list for the Forest dated March 15, 2018, with Forest-specific updates current as of March 30, 2020 (list attached as Appendix A).
2. Consulting element occurrence records (EORs) for TES species as maintained by the Virginia Division of Natural Heritage (VDNH) and supplied to the Forest.
3. Consulting species information, including county occurrence records, as maintained by the Fish and Wildlife Information Service (VAFWIS) of the Virginia Department of Game and Inland Fisheries (VDGIF).
4. Consulting with individuals in the private and public sector who are knowledgeable about the area and its flora and fauna.
5. Reviewing sources listed in the reference portion of this report.
6. Reviewing the results of past field surveys that may have been conducted in the area.

Most TES species known to occur on the Forest have unique habitat requirements, such as shale barrens, rock outcrops, bogs, caves, and natural ponds. Information gathered, analyzed, and presented in the Southern Appalachian Assessment dated July 1996 states that approximately 84% of threatened and endangered species and 74% of sensitive species are associated with rare or unique habitats, often referred to as rare communities. The BE completed for the Revised Jefferson Forest Plan, dated December 5, 2003, found that 87% of the sensitive species on the Jefferson NF are associated with rare communities or aquatic habitats.

Through cooperative agreements between the Forest and VDNH, Special Biological Areas have been identified and delineated on the Forest. These include rare and significant natural communities and vegetative types. These areas reflect current knowledge of the location, management, and protection needs of rare species and associated significant natural communities on the Forest. These areas are identified in the 2004 Jefferson National Forest Revised Forest Plan (Plan), pages 3-27 through 3-30, as Botanical and Zoological Areas (Management Area 4D).

The need to conduct site-specific surveys of TES species for this project was assessed. Based on this assessment, affected potential habitat in the project areas was surveyed for TES species. Appendix A of this document lists all 199 TES species currently known, or expected to occur, on or near the George Washington and Jefferson National Forests. All species on the list were considered during the analysis for this project.

A “step down” process was followed to eliminate species from further analysis and focus on those species that may be affected by proposed project activities. Species not eliminated are then analyzed in greater detail. Results of this step-down analysis process are displayed in the Occurrence Analysis Results (OAR) column of the table in Appendix A. First, the range of a species was considered. Species’ ranges on the Forest are based on county records contained in such documents as the “Atlas of the Virginia Flora,” but are further refined when additional information is available, such as more recent occurrences documented in scientific literature or in Natural Heritage databases. Many times, range information clearly indicates a species will not occur in the project area due to the restricted geographic distribution of most TES species. When the project area is outside a known species range, that species is eliminated from further consideration by being coded as OAR code “1” in the Appendix A table. For this project, 111 species were eliminated from further consideration because the project area is not within the species’ known range.

For the remaining sensitive species, after this first step, results from past surveys and knowledge of the area, and potential for suitable habitat were considered.

Field Surveys and Results

Some species could not be eliminated from further consideration based on known range. Wildlife and botanical surveys of the project areas were not conducted.

From knowledge of the areas, 55 species were eliminated from further consideration because of: a) a lack of suitable habitat in the project areas (OAR code “2”); b) habitat present and the species has been searched for, but has not been found (OAR code “3”); c) species occurs in the project areas, but out of the actual area of activity (OAR code “4”); d) aquatic species of habitat known or suspected downstream of project or activity areas but outside the identified geographic bounds of water resource cumulative effects analysis area (defined as the point below which sediment amounts are immeasurable and insignificant) (OAR code “7”); and e) historic records for this species only; or no known records on GWJ; or species considered extirpated from Virginia/West Virginia (OAR code “10”).

Species Identified as Being in the Action Area or Potentially Affected by the Action

From past field surveys and knowledge of the area, and given the proposed action, those species which are analyzed and discussed further in this document are those that: a) are found to be located in the activity areas (OAR code “5”); b) were not seen during the survey(s), but possibly occur in the activity areas based on habitat observed during the survey(s) or field survey was not conducted when species is recognizable (OAR code “6”); c) for aquatic species, they are known or suspected downstream of project or activity areas and within identified geographic bounds of water resource cumulative effects analysis area (OAR code “8”) and d) federally listed mussel and/or fish species known in 6th level watershed of project areas. Conservation measures from USFWS/FS Conservation Plan applied (OAR code “9”).

As a result of this process, the following 33 species are known or suspected to occur in or near the area or are potentially impacted by the proposed action and are coded OAR Code 5, 6, or 9:

OAR Code	Scientific Name	Common Name	Taxa	TES
6	<i>Myotis leibii</i>	Eastern small-footed bat	Mammal	S
6	<i>Perimyotis subflavus</i>	Tricolored bat	Mammal	S
6	<i>Myotis sodalis</i>	Indiana bat	Mammal	E
6	<i>Myotis septentrionalis</i>	Northern long-eared bat	Mammal	T
9	<i>Chrosomus cumberlandensis</i>	Blackside dace	Fish	T
9	<i>Erimystax cahni</i>	Slender chub	Fish	T
9	<i>Etheostoma percnurum</i>	Duskytail darter	Fish	E
9	<i>Noturus flavipinnis</i>	Yellowfin madtom	Fish	T
9	<i>Pegias fabula</i>	Little-winged pearlymussel	Mussel	E
9	<i>Ptychobranchus subtentum</i>	Fluted kidneyshell	Mussel	E
9	<i>Quadrula sparsa</i>	Appalachian monkeyface	Mussel	E
9	<i>Villosa trabalis</i>	Cumberland bean	Mussel	E
9	<i>Quadrula intermedia</i>	Cumberland monkeyface	Mussel	E
9	<i>Epioblasma brevidens</i>	Cumberlandian combshell	Mussel	E
9	<i>Lemiox remosus</i>	birdwing pearlymussel	Mussel	E
9	<i>Hemistena lata</i>	cracking pearlymussel	Mussel	E
9	<i>Dromus dromus</i>	dromedary pearlymussel	Mussel	E
9	<i>Cypregenia stegaria</i>	fanshell	Mussel	E
9	<i>Epioblasma capsaeformis</i>	oyster mussel	Mussel	E
9	<i>Fusconaia cuneolus</i>	finerayed pigtoe	Mussel	E
9	<i>Epioblasma torulosa gubernaculum</i>	green blossom	Mussel	E
9	<i>Lampsilis abrupta</i>	pink mucket	Mussel	E
9	<i>Villosa perpurpurea</i>	purple bean	Mussel	E
9	<i>Pleurobema plenum</i>	rough pigtoe	Mussel	E
9	<i>Quadrula cylindrical strigillata</i>	rough rabbitsfoot	Mussel	E
9	<i>Fusconaia cor</i>	shiny pigtoe	Mussel	E
9	<i>Epioblasma triquetra</i>	snuffbox	Mussel	E
9	<i>Cumberlandia monodonta</i>	spectaclecase	Mussel	E
9	<i>Plethobasus cyphus</i>	sheepnose	Mussel	E
9	<i>Pleurobema dolabellodes</i>	slabside pearlymussel	Mussel	E
9	<i>Epioblasma florentina aureola</i>	golden riffleshell	Mussel	E
9	<i>Cambarus callainus</i>	Big Sandy crayfish	Crayfish	T
6	<i>Danaus plexippus</i>	Monarch	Insect	S

Other than the 33 species above, no other TES species or designated/proposed critical habitat was identified during field surveys or considered to exist within the project area or the aquatic cumulative effects boundary.

Effects of Proposed Management Action on Each Identified Species

The analysis of possible effects to species identified as known or expected to occur in the vicinity of the proposed project, or likely to be impacted by the action includes the following existing information:

- Data on species/habitat relationships
- Species range distribution
- Occurrences developed from past field surveys or field observations
- The amount, condition, and distribution of suitable habitat

Effects to Indiana bat, Northern long-eared bat, Eastern Small-footed bat, and Tri-colored bat:

Effects to the federally endangered Indiana bat (*Myotis sodalis*), and Northern long-eared bat were considered in this BE/BA because it is assumed the entire Forest is potential habitat for this species. Effects to the sensitive eastern small-footed bat (*Myotis leibii*) and Tri-colored bat are also considered because habitat exists in or near the project areas and these bats may forage or roost in the area at some time during the year.

Mowing, disking, or burning the wildlife clearings will have no negative effect on TES bats. No mature trees will be disturbed and the clearings are maintained in a state that will provide potential foraging habitat for these species. The net effect should be a beneficial effect for these species.

Effects to Sensitive Species

Monarch (*Danaus plexippus*)

The monarch butterfly is a well-known and widespread species belonging to the family Nymphalidae. The butterfly is relatively large with a wingspan of 3.75 to 4.875 inches. Wings are orange to orange-brown with wide black borders and black veins. Males have a patch of scent scales on each hind wing that appear as a black spot (BMNA 2017).

North America forms the core of the monarch's range but the overall range extends through Central America to northern South America. The North American populations are strongly migratory, resulting in different seasonal ranges. Essential overwintering areas for North American populations are limited to a few dozen places in coastal California and the mountains of Mexico. The summer range includes portions of the conterminous U.S and the southern portions of all Canadian provinces bordering the US where milkweeds (*Asclepias* spp.) occur. Populations in south Florida and the Gulf Coast are non-migratory. Breeding occurrences are not definable in many places.

The Monarch caterpillar feeds on a variety of milkweed species, the most important of which are common milkweed (*Asclepias syriaca*), swamp milkweed (*A. incarnata*), and green antelopehorn (*A. viridis*). The first two are used primarily in summer/fall and the last is used in spring and sometimes summer/fall. Eggs are laid singly on the underside of host plant leaves. Caterpillars,

with circular strips of white/yellow and black feed on both leaves and flowers. The chrysalis is a bright light green with black and gold ornamentation.

In general, breeding areas are virtually all patches of milkweed in North America and some other regions. Any patch of milkweed is likely to be used at least some seasons in much of the range. A critical conservation feature for North American populations is the overwintering habitats, which are certain high altitude Mexican conifer forests or coastal California conifer or Eucalyptus groves as identified in literature. It appears most North American monarchs overwinter in one of these two areas. In the fall, adults migrate from the eastern and central US migrate to central Mexico (population 2, NatureServe 2018). All adults are dependent on a variety of nectar sources along migration routes. Population 2 is in drastic decline compared with numbers recorded 10-20 years ago (NatureServe 2018). Factors such as illegal logging and erratic and extreme weather in the very narrowly distributed wintering range, and loss of milkweed and nectars plants in the mid-western United States in particular have led to declines (Pleasants 2015, Ramírez et al. 2015, NatureServe 2018). Widespread use of neonicotinoid pesticides may also contribute to declines (Krischik et al. 2015, Percenka and Lundgren 2015). Population 2 has global rank of G4T1, indicating that while widespread, the population is critically imperiled. The species is known from across the conterminous US into southern Canada. It is associated with open lands, including wildlife openings, native prairie patches, roadsides, open woodlands, early successional woody habitat, utility corridors and grassland/shrublands where host and nectar plants are found. Monarchs can be found foraging in suitable habitat, during the breeding season and fall migration, throughout the George Washington and Jefferson National Forest.

Management of roadside corridors, silvicultural management, prescribed fire, open grassland/shrublands, range allotments, and trails to include a variety of milkweed and flowering nectar plants will provide suitable habitat for monarch butterflies; therefore there should be no net negative effect nor a trend toward federal listing.

Summary of Determination of Effects to Species

Threatened and Endangered (T&E) Species and Proposed Species

Aquatic Threatened and Endangered Species

On April 23, 2004, the GWJNF received a letter from the Southwest Virginia Field Office of the USFWS stating: “Since the standards of this Conservation Plan were incorporated into the 2004 Jefferson Land Resource Management Plan (JLRMP), further consultation on activities that may affect listed mussels and fish is not required for projects that adhere to the conservation measures in the JLRMP and this Conservation Plan.” As agreed to by the USFWS, the development and implementation of this plan covers Section 7 consultation requirements under the Endangered Species Act, and serves as informal consultation.

The proposed project will have no effect on any aquatic Threatened or Endangered species.

Determination of Effect

For the proposed action, the project will have **no effect** on the federally listed species that could potentially be in the project area given in Table 1. The treatment will also have **no impact** on the Regional Forester's Sensitive Species listed in Table 1; and therefore, will not lead towards Federal listing under provisions of the federal Endangered Species Act. For all other sensitive species there will be **no impact** since all other species (plants and animals) are not susceptible to the proposed treatment methods.

/s/ Charles Lane

Charles Lane

Date: February 18, 2021

District Biologist

Attachments: References

Appendix A – Forest TES List

References

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APPENDIX A
Documentation of Threatened, Endangered or Sensitive Species Occurrences for
Clinch Wildlife Clearing Improvement Project
Coding for Occurrence Analysis Results (OAR) for 199 species

Forest updated March 30, 2020 (based on Region 8 sensitive species list effective **March 15, 2018**)

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
VERTEBRATE										
Fish										
7	-	X	<i>Ammocrypta clara</i>	Western sand darter	Clinch R, Powell R	Aquatic-rivers.	S	G3	S1	-
9	-	X	<i>Chrosomus cumberlandensis</i>	Blackside dace	Upper Cumberland R, Upper Powell R, Poor Fk Cumberland R, Clinch R drainage - Staunton Ck McGhee Ck	Aquatic-streams.	T	G2	S1	S3 (KY)
1	-	X	<i>Erimonax monachus</i>	Spotfin chub	Lower N Fk Holston R	Aquatic-streams.	T	G2	S1	-
9	-	X	<i>Erimystax cahni</i>	Slender chub	Two sites - Powell R, Lee Co	Aquatic-rivers.	T	G1	S1	-
7	-	X	<i>Erimystax insignis</i>	Blotched chub	Clinch-Powell system, S Fk Holston R	Aquatic-streams/rivers.	S	G4	S3	-
1	-	X	<i>Etheostoma acuticeps</i>	Sharphead darter	S and Middle Fk Holston R	Aquatic-rivers.	S	G3	S1	-
7	-	X	<i>Etheostoma cinereum</i>	Ashy Darter	Upper Clinch R, Guest R gorge	Aquatic-rivers.	S	G2G3	S1	-
1	-	X	<i>Etheostoma osburni</i>	Candy darter	Big Stony Ck, Dismal Creek, Cripple Creek (New R watershed)	Aquatic-streams.	PT	G3	S1	S2
9	-	X	<i>Etheostoma percnurum</i>	Duskytail darter	Copper Ck, Clinch R	Aquatic-rivers.	E	G1	S1	-
7	-	X	<i>Etheostoma denoncourtii</i>	Golden darter	Four sites Clinch R, lower Copper Ck.	Aquatic-rivers. Formerly: Tippecanoe darter, <i>Etheostoma tippecanoe</i> .	S	G3G4	S1	S2
7	-	X	<i>Etheostoma vulneratum</i>	Wounded darter	N & S Fk Holston R, Clinch R, Powell R.	Aquatic-Rivers.	S	G3	S2S3	-
7	-	X	<i>Ichthyomyzon greeleyi</i>	Mountain brook lamprey	M, N Fk Holston R, Copper Ck, Indian Ck, Clinch R, Powell R	Aquatic-rivers.	S	G3G4	S2	S1
7	-	X	<i>Notropis ariommus</i>	Popeye shiner	N Fk Holston R, Clinch R, Powell R	Aquatic-rivers.	S	G3	S2S3	S2
1	X	X	<i>Notropis semperasper</i>	Roughhead shiner	Upper James R watershed above Buchanan (Cowpasture R, Jackson R, Craig Ck)	Aquatic-rivers.	S	G2G3	S2S3	-
9	-	X	<i>Noturus flavipinnis</i>	Yellowfin madtom	Lower & Mid reaches of Copper Ck, Powell R	Aquatic-streams.	T	G1	S1	-
1	X	X	<i>Noturus gilberti</i>	Orangefin madtom	S Fk Roanoke R watershed, Roanoke R above Salem, Craig Ck, Johns Ck, Cowpasture R	Aquatic-streams.	S	G2	S2	-
7	-	X	<i>Percina burtoni</i>	Blotchside logperch	N Fk Holston R, Clinch R, Copper Ck, Little R	Aquatic-rivers.	S	G2G3	S1	-
1	-	X	<i>Percina rex</i>	Roanoke logperch	Upper Roanoke R watershed	Aquatic-rivers.	E	G1G2	S1S2	-
7	-	X	<i>Percina williamsi</i>	Sickle darter	S & N Fk Holston R above Saltville, Clinch R - lower Copper Ck.	Aquatic-rivers. Formerly: <i>Percina macrocephala</i> .	S	G2	S1S2	S2
1	-	X	<i>Phenacobius teretulus</i>	Kanawha minnow	Upper New R watershed	Aquatic-streams.	S	G3G4	S2S3	S1
Amphibian										
2	-	X	<i>Aneides aeneus</i>	Green salamander	Bland, Dickenson, Lee, Russell, Scott, Tazewell, Washington, Wise, Wythe Cos VA; Greenbrier, Monroe, Pendleton Cos WV	Damp (not wet) crevices in shaded rock outcrops and ledges; beneath loose bark; in cracks of standing or fallen trees; in or under logs on ground.	S	G3G4	S3	S3

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
7	-	X	<i>Cryptobranchus alleganiensis</i>	Hellbender	N & S Fk Holston (Whitetop Laurel), Clinch R, Copper Ck, Powell R.	Aquatic-rivers, streams.	S	G3G4	S2S3	S2
1	-	X	<i>Desmognathus organi</i>	Northern pygmy salamander	Grayson, Smyth, Washington Cos. Whitetop Mt. and Mt. Rogers	Spruce-fir forests and adjacent northern hardwoods, >3600'	S	G3	S2	-
1	-	X	<i>Plethodon hubrichti</i>	Peaks of Otter salamander	Peaks of Otter, Apple Orchard Mtn	Mixed oak, late successional with loose rocks and logs, >1800'.	S	G2	S2	-
1	X	-	<i>Plethodon punctatus</i>	Cow Knob salamander	Shenandoah Mtn, VA & WV	Mixed oak, late successional with loose rocks and logs, >2500'.	S	G3	S2	S1
1	X	-	<i>Plethodon sherando</i>	Big Levels salamander	Big Levels, Augusta Co	Forest and rocky talas slopes 1900' – 3580'.	S	G2	S2	-
1	X	-	<i>Plethodon virginia</i>	Shenandoah Mountain salamander	Rockingham Co	Temperate forests between 3600' – 3900'.	S	G2G3	S2	SNR
1	-	X	<i>Plethodon welleri</i>	Weller's salamander	Mt Rogers & Whitetop Mtn	Spruce-fir forests and adjacent northern hardwoods.	S	G3	S2	-
Reptile										
1	X	-	<i>Clemmys guttata</i>	Spotted turtle	Maple Flats, Augusta Co	Mostly unpolluted, shallow bodies of water with a soft bottom and aquatic vegetation; small marshes, marshy pastures, bogs, fens, woodland streams, swamps, small ponds, vernal pools, and lake margins.	S	G5	S4	S1
1	X	-	<i>Glyptemys insculpta</i>	Wood turtle	Page, Rockingham, Shenandoah Cos; N Shenandoah R watershed	Along permanent streams during much of year; in summer may roam widely overland; variety of terrestrial habitats adjacent to streams, including deciduous woods, cultivated fields, and woodland bogs, marshy fields and pastures. Overwinters in streams.	S	G3	S2	S3
1	X	X	<i>Pituophis melanoleucus</i>	Pinesnake	Historic records from Alleghany, Augusta, Botetourt, Craig, Rockingham Cos., VA; Monroe Co, WV. No current records known from GWJNF.	Xeric, pine-dominated or pine-oak woodland with open, low understory established on sandy soils; require forest openings, with level, well-drained sandy soils and little shrub cover as nesting/hibernation sites.	S	G4	S1?	SH
Bird										
1	-	X	<i>Ammodramus henslowii</i>	Henslow's Sparrow	Pulaski Co (Radford Arsenal). No nest records known on GWJNF.	Open fields, meadows with grass interspersed with weeds or shrubby vegetation, especially in damp or low-lying areas; unmowed hayfields.	S	G4	S1B	S3B
Mammal										
1	-	-	<i>Corynorhinus rafinesquii</i>	Rafinesque's big-eared bat	Has not been found in VA but has occurred nearby in WV, KY, & TN. In 1978, a large nursery colony was found in Hancock Co., TN, very close to the VA-TN border. Only possible in Lee, Scott, Washington Co.	Caves in winter, large hollow trees summer, may also use cliff-lines, buildings, and bridges in summer. Not on VADCR-NHP "Rare Animal" list.	S	G3G4	-	S1
2	X	X	<i>Corynorhinus townsendii virginianus</i>	Virginia big-eared bat	Summer: VA - Tazewell Co (3 caves), Highland Co (1 cave); WV - Pendleton Co (4 caves); Winter: Highland, Rockingham, Bland, and Tazewell Cos (6 caves); Pendleton Co (6 caves). Largest VA population in Tazewell Co and largest WV population in Pendleton Co. Small numbers of bats (usually <10) in a few other widely scattered caves during summer months. Bath & Pulaski Co records are historic. No occupied caves currently known on Forest.	Resides in caves winter and summer. Short distance migrant (<40 miles) between winter and summer caves. Forages primarily on moths and foraging habitat is common (fields, forests, meadows, etc.). Forages within 6 miles of summer caves. USFWS Critical Habitat is 5 caves in WV (4 Pendleton Co and 1 Tucker Co). Closest Critical Habitat cave to GWJNF is ~3 miles in Pendleton Co, WV. OAR code of "2" used when project further than 6 miles from summer or winter occupied cave.	E	G3G4T2	S1	S2
1	-	X	<i>Glaucomys sabrinus coloratus</i>	Carolina northern flying squirrel	Mt Rogers & Whitetop area	Spruce-fir forests and adjacent northern hardwoods.	E	G5T2	S1	-
1	X	-	<i>Glaucomys sabrinus fuscus</i>	Virginia northern flying squirrel	Laurel Fork area, Highland Co	Spruce forests and adjacent northern hardwoods.	S	G5T2	S1	S2

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
2	-	X	<i>Myotis grisescens</i>	Gray bat	Ridge & Valley, Clinch R watershed; Russell Fk at Russell Fk/Pound R confluence.	Caves winter and summer, forages widely.	E	G3	S1	-
6	X	X	<i>Myotis leibii</i>	Eastern small-footed bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Hibernates in caves during winter, roosts in crevices of large rock outcrops, cliffs, and under large rocks in talus & boulder-fields during summer, plus similar man-made structures like rip-rap and bridges, forages widely in all forested and open habitat types over both ridges and valleys.	S	G1G3	S2	S1
6	X	X	<i>Myotis septentrionalis</i>	Northern long-eared bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Hibernates in crevices and cracks of cave walls during winter (sometimes mines & tunnels), difficult to find and rarely seen. During summer, forages widely and roosts singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Also may roost in structures like barns, sheds, & houses. Decline due to WNS.	T	G1G2	S3	S3
6	X	X	<i>Myotis sodalis</i>	Indiana bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Caves winter, upland hardwoods summer, forages widely along riparian areas and open woodlands.	E	G2	S1	S1
6	X	X	<i>Perimyotis subflavus</i>	Tricolored bat	Every county in VA, WV, KY	Caves in winter: Caves, trees, cliffs, barns during summer months. Decline due to WNS. Formally: Eastern pipistrelle.	S	G3	S1S3	
INVERTEBRATE										
Snail (Mollusk, Class Gastropoda)										
1	X	-	<i>Fontigens tartarea</i>	Organ cavesnail	Bath, Highland Cos	Caves. Obligate troglobite.	S	G2	S1S2	S2
2	-	X	<i>Gastrodonta fonticula</i>	Appalachia bellytooth	No known records on GWJ. Scott and Wise Co records need to be verified.	Damp, wooded environments, particularly in deep piles of wet leaf litter and around rotting wood debris.	S	G3G4	SU	SNR
1	X	X	<i>Glyphyalinia raderi</i>	Maryland glyph	Alleghany, Montgomery Cos	Calciphile, edge of seeps within leaf litter. May burrow.	S	G2	S1S2	S2
1	X	-	<i>Helicodiscus diadema</i>	Shaggy coil	Alleghany Co	Calciphile; semi-open, calcium-rich environments, especially limestone rubble/talus and thinly wooded limestone hills.	S	G1	S1	-
1	X	X	<i>Helicodiscus triodus</i>	Talus coil	Alleghany, Botetourt, Rockbridge Cos	Calciphile, limestone rubble on wooded hillsides and near cave entrances.	S	G2	S1S2	SH
1	-	X	<i>Io fluviatilis</i>	Spiny riversnail	Clinch R, N Fk Holston R	Aquatic-rivers.	S	G2	S2	-
1	-	X	<i>Paravitrea septadens</i>	Brown supercoil	Breaks Interstate Park, Dickenson Co; Buchanan Co., VA. No known records on GWJ.	Steep forested slopes and in ravines, often among woody debris, rocks, or deeper leaf litter; mixed eastern hemlock-hardwood forest, also in richer hardwood stands.	S	G1	S1	-
1	-	X	<i>Stenotrema altispira</i>	Highland slitmouth	No known records on GWJ. Grayson and Smyth Co records need to be verified.	Higher elevations, in leaf litter and woody debris.	S	G3	S1	-
1	-	X	<i>Ventridens decussatus</i>	Crossed dome	No known records on GWJ. Scott Co records need to be verified.	High elevations, usually >3000', in leaf litter, particularly oak leaves.	S	G3	SU	-
1	-	-	<i>Vertigo bollesiana</i>	Delicate vertigo	No known records on GWJ. VA and WV records need to be verified.	Leaf litter often under shrubs, on cliff-face ledges and boulder tops in mesic upland forest, and damp microsites in northern white cedar wetlands.	S	G4	SU	-
1	X	-	<i>Vertigo clappi</i>	Cupped vertigo	Greenbrier & Pendleton Cos, WV	Well-rotted, humid leaf litter and fine soil on shaded boulders, talus, ledges, and bases of forested lime-rich bedrock outcrops.	S	G1G2	SU	SNR
Mussel (Mollusk, Class Bivalvia)										

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
7	-	X	<i>Alasmodonta marginata</i>	Elktoe	Greenbrier R & New R, WV. Upper New R; Reed Creek; Sinking Creek (Giles Co.); Wolf Creek (Bland Co.); upper S Fk Holston; historical Upper Clinch.	Aquatic-rivers.	S	G4	S1S2	S2
1	X	-	<i>Alasmodonta varicosa</i>	Brook floater	Potomac drainage	Aquatic-rivers.	S	G3	S1	S1
7	-	X	<i>Alasmodonta viridis</i>	Slippershell mussel	Historic in Upper Clinch R excluding Copper Creek where extant; Upper S Fk Holston	Aquatic-rivers.	S	G4G5	S1	-
9	-	X	<i>Cumberlandia monodonta</i>	Spectaclecase	2 sites Clinch R	Aquatic-rivers.	E	G3	S1	-
9	-	X	<i>Cyprogenia stegaria</i>	Fanshell	Lower Clinch R, Scott Co	Aquatic-rivers.	E	G1Q	S1	S1
9	-	X	<i>Dromus dromas</i>	Dromedary pearlymussel	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
1	X	X	<i>Elliptio lanceolata</i>	Yellow lance	Roanoke R, James R	Aquatic-rivers.	T	G2G3	S2S3	-
9	-	X	<i>Epioblasma brevidens</i>	Cumberlandian combshell	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
9	-	X	<i>Epioblasma capsaeformis</i>	Oyster mussel	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
9	-	X	<i>Epioblasma florentina aureola</i>	Golden riffleshell	Restricted to lower 1.0 mile of Indian Ck to Clinch R. All other historical populations in M & Upper Tennessee R system now extirpated.	Aquatic-rivers. Formerly: tan riffleshell.	E	G1T1	S1	-
9	-	X	<i>Epioblasma torulosa gubernaculum</i>	Green-blossom pearlymussel	Clinch R, N Fk Holston R	Aquatic-rivers.	E	G2TX	SX	-
9	-	X	<i>Epioblasma triquetra</i>	Snuffbox	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G3	S1	S2
9	-	X	<i>Fusconaia cor</i>	Shiny pigtoe	Clinch R, Powell R, N Fk Holston R, Copper Ck	Aquatic-rivers.	E	G1	S1	-
9	-	X	<i>Fusconaia cuneolus</i>	Fine-rayed pigtoe	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
1	-	X	<i>Fusconaia masoni</i>	Atlantic pigtoe	Roanoke R, Craig Ck drainage	Aquatic-rivers.	S	G2	S2	-
9	-	X	<i>Hemistena lata</i>	Cracking pearlymussel	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
9	-	X	<i>Lampsilis abrupta</i>	Pink mucket	Clinch R	Aquatic-rivers.	E	G2	SX	S1
1	X	-	<i>Lampsilis cariosa</i>	Yellow lampmussel	N Fk Shenandoah R; Shenandoah, Warren Cos.	Aquatic-rivers.	S	G3G4	S2	S1
7	-	X	<i>Lasmigona holstonia</i>	Tennessee heelsplitter	Upper Clinch, N and M Fk Holston R drainages; Wolf Ck, Bland Co below Burkes Garden	Aquatic-streams.	S	G3	S1	-
1	X	-	<i>Lasmigona subviridis</i>	Green floater	Widely distributed in N & S Fk Shenandoah R, Pedlar R, James R	Aquatic-rivers.	S	G3	S2	S2
9	-	X	<i>Lemiox rimosus</i>	Birdwing pearlymussel	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
1	X	X	<i>Parvaspina collina</i>	James spinymussel	Potts Ck, Craig Ck, Johns Ck, Patterson Run, Pedlar R, Cowpasture R, Mill Ck (Deerfield)	Aquatic-rivers. Formerly: <i>Pleurobema collina</i> .	E	G1	S1	S1
9	-	X	<i>Pegias fabula</i>	Little-winged pearlymussel	Clinch R, N Fk Holston R, S Fk Holston R, Little R	Aquatic-streams.	E	G1	S1	-
9	-	X	<i>Plethobasus cyphus</i>	Sheepnose	Clinch R, Powell R	Aquatic-rivers.	E	G3	S1	S1
7	-	X	<i>Pleurobema cordatum</i>	Ohio pigtoe	Clinch R	Aquatic-rivers.	S	G4	S1	S2

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
7	-	X	<i>Pleurobema oviforme</i>	Tennessee clubshell	Clinch R, Powell R, N, Middle, S Fk Holston R	Aquatic-streams.	S	G2G3	S2S3	-
9	-	X	<i>Pleurobema plenum</i>	Rough pigtoe	Clinch R	Aquatic-rivers.	E	G1	SH	SH
7	-	X	<i>Pleurobema rubrum</i>	Pyramid pigtoe	Upper Clinch R	Aquatic-rivers.	S	G2G3	SH	-
7	-	X	<i>Pleuroaia barnesiana</i>	Tennessee pigtoe	Clinch R, Powell R, N Middle, S Fk Holston R	Aquatic-rivers.	S	G2G3	S2	-
9	-	X	<i>Pleuroaia dolabelloides</i>	Slabside pearlymussel	Clinch R, M Fk Holston, N Fk Holston R	Aquatic-rivers.	E	G2	S2	-
9	-	X	<i>Ptychobranchus subtentum</i>	Fluted kidneyshell	Holston R., Powell R., Indian R., Clinch R., Little R., Copper Ck., Big Moccasin Ck. Critical Habitat: Indian Ck, VA: M Fk Holston R. VA: Big Moccasin Ck., VA: Copper Ck., VA: Clinch R, TN, VA: Powell R., TN, VA	Aquatic-rivers.	E	G2	S2	-
9	-	X	<i>Quadrula cylindrica strigillata</i>	Rough rabbits foot	Clinch R, Powell R, N Fk Holston R, Copper Ck	Aquatic-streams.	E	G3G4T2	S2	-
9	-	X	<i>Quadrula intermedia</i>	Cumberland monkeyface	Powell R	Aquatic-rivers.	E	G1	S1	-
9	-	X	<i>Quadrula sparsa</i>	Appalachian monkeyface	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
7	-	X	<i>Toxolasma lividum</i>	Purple lilliput	N Fk Holston R, Clinch R	Aquatic-rivers.	S	G3Q	SH	-
9	-	X	<i>Villosa perpurpurea</i>	Purple bean	Clinch R, Copper Ck	Aquatic-rivers.	E	G1	S1	-
9	-	X	<i>Villosa trabalis</i>	Cumberland bean	Clinch R	Aquatic-rivers.	E	G1	SX	-
Spider (Arachnid)										
1	-	X	<i>Microhexura montivaga</i>	Spruce-fir moss spider	Whitetop Mtn	Damp, well-drained moss and liverwort mats on boulders in mature spruce-fir forests.	E	G1	S1	-
Amphipod (Crustacean, Order Amphipoda)										
1	-	X	<i>Stygobromus abditus</i>	James Cave amphipod	James, Sam Bells caves, Pulaski Co; Watsons cave, Wythe Co; and other New River caves.	Aquatic-caves, water well.	S	G3	S3	-
1	-	X	<i>Stygobromus emarginatus</i>	Greenbrier Cave amphipod	Greenbrier, Monroe Cos, WV	Aquatic-caves.	S	G3	-	S3
1	X	-	<i>Stygobromus gracilipes</i>	Shenandoah Valley cave amphipod	Frederick, Rockingham, Shenandoah, Warren Cos	Aquatic-caves.	S	G3G4	S3	S1
1	X	-	<i>Stygobromus hoffmani</i>	Alleghany County cave amphipod	Low Moor cave, Alleghany Co	Aquatic-caves, groundwater habitats including springs and seeps.	S	G2	S2	-
1	X	-	<i>Stygobromus mundus</i>	Bath County cave amphipod	Alleghany, Bath Cos	Aquatic-caves.	S	G2G3	S1S2	-
1	-	X	<i>Stygobromus pollostus</i>	Least Cave stygobromid	Greenbrier, Monroe Cos, WV	Aquatic-caves.	S	G2G3	-	S3
1	-	X	<i>Stygobromus spinatus</i>	Spiny Cave stygobromid	Greenbrier, Monroe Cos, WV	Aquatic-caves.	S	G2G3	-	S2
Isopod (Crustacean, Order Isopoda)										
1	X	-	<i>Antrolana lira</i>	Madison Cave Isopod	Documented population centers in Waynesboro-Grottoes area, Augusta Co; Harrisonburg area Rockingham Co; valley of main stem of Shenandoah R, Warren, Cos,VA: Jefferson Co, WV. Not known from GWNF.	Aquatic-subterranean obligate in caves and karst groundwater.	T	G2G4	S2	S1

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
1	-	X	<i>Caecidotea incurva</i>	Incurved cave isopod	McCullin Cave, Smyth Co; Groseclose Cave No. 1, Wythe Co	Aquatic-caves.	S	G2G4	S2	-
1	X	X	<i>Miktoniscus racovitzai</i>	Racovitza's terrestrial cave isopod	Alleghany, Botetourt, Page, Rockbridge, Shenandoah Cos	Aquatic-caves.	S	G3G4	S2	-
Crayfish (Crustacean, Order Decapoda)										
9	-	X	<i>Cambarus callainus</i>	Big Sandy crayfish	In VA, Upper Russell Fk drainage Big Sandy R	Aquatic-streams. Fast flowing streams of moderate width. Formerly: <i>Cambarus veteranus</i> .	T	G2	S1S2	S1
Centipede (Insect, Order Chilopoda)										
1	X	X	<i>Escaryus cryptorobius</i>	Montane centipede	The Priest, Nelson Co; Whitetop Mtn, near junction of Grayson, Washington, Smyth Co	Upper soil horizon, spruce-birch forests.	S	G2	S2	-
1	-	X	<i>Escaryus orestes</i>	Whitetop Mountain centipede	Whitetop Mtn, near junction of Grayson, Washington, Smyth Co	Dark moist soil and litter, spruce-birch forests.	S	G1G2	S1S2	-
Springtail (Insect, Order Collembola)										
1	X	-	<i>Pygmarrhopalites sacer</i>	A cave springtail	Bath Co	Caves.	S	G2	S2	-
Dragonfly (Insect, Order Odonata)										
7	X	X	<i>Gomphus viridifrons</i>	Green-faced clubtail	New R, Craig Ck, Pound R, Locust Spring	Aquatic-rivers.	S	G3G4	S2	S2
1	-	X	<i>Ophiogomphus howei</i>	Pygmy snaketail	Upper New R; Carroll, Grayson, Wythe Cos	Aquatic-rivers.	S	G3	S1S2	-
Stonefly (Insect, Order Plecoptera)										
1	-	X	<i>Allocapnia fumosa</i>	Smokies snowfly	High elevation rheocrenes (flowing springs) of Mt. Rogers. Grayson, Smyth Cos.	Aquatic-streams.	S	G2	S1S2	
1	-	X	<i>Megaleuctra williamsae</i>	Smokies needelfly	Mt Rogers & Whitetop Mtn	Aquatic-streams.	S	G2	S1S2	-
1	-	X	<i>Taeniopteryx nelsoni</i>	Cryptic willowfly	Lewis Fk & Grindstone Branch N of Mt Rogers	Aquatic-streams.	S	G1	S1	-
Beetle (Insect, Order Coleoptera)										
2	X	X	<i>Cicindela patruela</i>	Northern barrens tiger beetle	Blue Ridge, Ridge & Valley	Eroded slopes of exposed sandstone and conglomerate.	S	G3	S2	S2S3
1	-	-	<i>Pseudanophthalmus avernus</i>	Avernus Cave beetle	Endemic to Endless Caverns (commercial cave, non-FS) Rockingham Co.	Caves.	S	G1	S1	-
2	-	X	<i>Pseudanophthalmus cordicollis</i>	Little Kennedy Cave beetle	Endemic to Wise Co.	Caves.	S	G1	S1	-
1	X	-	<i>Pseudanophthalmus intersectus</i>	Crossroads Cave beetle	Known only from Crossroads Cave, Millboro Springs, Bath Co.	Caves.	S	G1G2	S1	-
Scorpionfly (Insect, Order Mecoptera)										
1	-	X	<i>Brachyanorpa jeffersoni</i>	Jefferson's short-nosed scorpionfly	Sugar Run Mountain, Giles Co; Whitetop Mtn, Smyth Co.	Moist soil around seeps. Only known from high elevation. Larvae use short burrows in loose soil and moss.	S	G2	S1S2	-
Butterfly, Skipper, Moth (Insect, Order Lepidoptera)										

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
1	-	X	<i>Atrytone arogos</i>	Arogos skipper	Historic records, Blacksburg area. Caldwell Fields records need to be verified.	Relatively undisturbed grasslands, prairies, sand prairies, serpentine barrens, grassland/herbaceous, old field. Larval host plant; big bluestem <i>Andropogon gerardi</i> .	S	G3	SH	-
2	X	X	<i>Calephelis borealis</i>	Northern metalmark	Alleghany, Augusta, Bath, Botetourt, Craig, Lee, Montgomery, Russell, Scott Cos: Historic records from Giles, Rockbridge Cos.	Openings within forested or wooded areas, natural outcrops, shale or limestone barrens, glades or powerline right of ways. Larvae host plant; round-leaf ragwort, <i>Senecio obovatus</i> .	S	G3G4	S2S3	S2
1	X	X	<i>Callophrys irus</i>	Frosted elfin	Frederick, Montgomery, Page, Roanoke Cos.	Dry, open woods, clearings, and road/powerline ROWs with abundant wild indigo, <i>Baptisia tinctoria</i> .	S	G3	S2?	S1
6	X	X	<i>Danaus plexippus</i>	Monarch	Blue Ridge, Ridge & Valley	Mixed hardwood/conifer forest; shrubland; grassland/herbaceous; old field; suburban/orchard; cropland/hedgerow. Larval host plant; milkweeds <i>Asclepias</i> spp.	S	G4	S4	S4
2	X	X	<i>Speyeria idalia</i>	Regal fritillary	Blue Ridge, Ridge & Valley	Riparian, grasslands-shrublands. Larval host plant, violets, <i>Viola</i> spp.	S	G3	S1	S1
2	X	X	<i>Erora laeta</i>	Early hairstreak	Bedford, Botetourt, Page, Rockbridge, Warren, Wise Cos., VA; Monroe, Pendleton Cos., WV. Historic records from Giles, Montgomery Cos.	Hardwood forests or hardwood-northern conifer mixed forests. Larval host food, young fruit of American beech, <i>Fagus grandifolia</i> , nuts of beaked hazelnut <i>Corylus cornuta</i> . Canopy dweller.	S	GU	S2	S2
1	X	X	<i>Erynnis martialis</i>	Mottled duskywing	Historic records from Augusta, Bedford, Botetourt, Craig, Montgomery, Rockbridge Cos.	Open woodland; barrens; open brushy fields. Larval host plant; New Jersey tea <i>Ceanothus americanus</i> .	S	G3	S1S3	S3
2	X	X	<i>Erynnis persius persius</i>	Persius duskywing	Blue Ridge, Ridge & Valley	Bogs, wet meadows, open seepages in boreal forests. Larval host plant; lupine, <i>Lupinus perennis</i> , wild indigo, <i>Baptisia tinctoria</i> .	S	G5T1T3	S1	-
2	X	-	<i>Pyrgus centaureae wyandot</i>	Appalachian grizzled skipper	Ridge & Valley	Shale barrens, open shaley oak woodlands. Larval host plant; cinquefoil, <i>Potentilla</i> spp, strawberry, <i>Fragaria virginiana</i> .	S	G5T1T2	S1	S1
1	X	X	<i>Catocala herodias gerhardi</i>	Herodias underwing	Bald Knob, Bath Co; Poverty Hollow, Montgomery Co; Sand Mtn, Wythe Co (non FS property)	Pitch pine/bear oak scrub woodlands, >3000'. Larval host plant; oak, <i>Quercus</i> spp.	S	G3T3	S2S3	SU
1	-	X	<i>Catocala marmorata</i>	Marbled underwing	Montgomery Co	Mesic montane hardwood forests; Forested wetland, riparian. Larval host plants; willows/cottonwoods, <i>Salix/Populus</i> .	S	G3G4	S2	-
1	X	-	<i>Euchlaena milnei</i>	Milne's euchlaena moth	Warm Springs Mtn, Catawba Creek Slopes, Sweet Spring Hollow, Salt Pond Mtn. (Doe Creek)	Moist, forested slopes of mixed pine hardwoods. Acidic oak woods.	S	G2G4	S2	S2
Bee (Insect, Order Hymenoptera)										
1	X	X	<i>Bombus affinis</i>	Rusty-patched bumble bee	Bath Co, VA: new location on Warm Springs RD, Duncan Knob found 6/2017. Following VA/WV county occurrences historic (Alleghany, Carroll, Frederick, Giles, Grayson, Montgomery, Nelson, Page, Pulaski, Rockbridge, Rockingham, Wythe Cos., VA; Hardy, Hampshire, Monroe, Pendleton, Pocahontas Cos, WV).	Habitat generalist: grasslands, old field, mature woods, open woodlands, mixed farmland edges, marshes, urban areas. Feeds from a variety of plants for pollen and nectar, including flowering rhododendron and mountain laurel. Nest sites include abandoned rodent burrows, fallen dead wood, stumps. Queen only overwinters.	E	G1	SH	-
NON-VASCULAR PLANT										
Lichen										
1	-	X	<i>Alectoria fallacina</i>	Witch's-hair lichen	Smyth, Grayson Co	S. Appalachian endemic. Conifer trees, especially fir rarely on birch, in spruce-fir forests; rarely fire cherry communities.	S	G2	SH	SNR
1	-	X	<i>Gymmoderma lineare</i>	Rock gnome lichen	Whitetop Mtn	Spruce-fir forests.	E	G2	S1	-

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
1	X	X	<i>Heterodermia appalachensis</i>	Appalachian shield lichen	St. Mary's Wilderness, Augusta Co.; Skidmore Fork, Rockingham Co.; Browns Run, Page Co.; rock outcrop, 6 mi. SE of Edinburg, Page Co.; summit of Whitetop Mt, Washington Co.	Bark of hardwoods, occasionally on shaded rocks.	S	G2?	S1	-
1	-	X	<i>Heterodermia erecta</i>	A foliose lichen	Whitetop Mtn	S. Appalachian endemic.	S	G1?	S1	-
1	-	X	<i>Hypotrachyna oostingii</i>	A foliose lichen	Mount Rogers, on Smyth, Grayson Co. line	Spruce-fir forests.	S	G2?	SU	-
1	-	X	<i>Hypotrachyna virginica</i>	Virginia hypotrachyna lichen	Mt Rogers & Whitetop Mtn	Spruce-fir forests. Found on spruce, fir, rhododendron in spruce-fir and fire-cherry communities in S. Appalachian Mtns. Typically at higher elevations, has been found at lower elevations.	S	G1G2	S1	SNR
1	-	X	<i>Lecanora masana</i>	A lichen	Whitetop Mtn, and Grayson, Smyth Cos	S. Appalachian endemic. Spruce-fir, northern hardwood-conifer forest.	S			
1	X	-	<i>Melanelia culbersonii</i>	Culberson's Black-parmelia	Massanutten (Fridley watershed) Rockingham Co; along trail from Wolf Gap Campground to Big Schloss, Shenandoah Co.	Rocks in open areas and on talus slopes. Fully exposed, minimally weathered quartzite and sandstone boulderfields at elevations from about 1000-3300 ft.	S	G2	S4	-
Liverwort										
1	-	X	<i>Bazzania nudicaulis</i>	A liverwort	Mt Rogers & Whitetop Mtn	Bark and rock outcrops in spruce-fir forests.	S	G2G3	S?	-
1	X	-	<i>Cephaloziella spinicaulis</i>	A liverwort	Along SR 33, 10 miles W of Harrisonburg.	Damp soil in crevices of shaded sedimentary rocks, in hemlock-hardwoods forest and humid to dry faces of ledges and cliffs in open oak-hickory forest.	S	G3G4	SNR	-
1	-	X	<i>Leptoscyphus cuneifolius</i>	Wedge Flapwort	Grayson Co	Bark of Fraser fir.	S	G4G5	SH	-
2	-	X	<i>Nardia lescurii</i>	A liverwort	Blue Ridge, Ridge & Valley	Riparian - on peaty soil over rocks, usually in shade and associated with water, <3000'.	S	G3?	S1	-
1	-	X	<i>Plagiochila austinii</i>	A liverwort	Little Stony Ck – Cascades; Red Ck on Beartown Mtn	Rich, moist, densely forested ravines; shaded outcrops.	S	G3	S?	-
1	-	X	<i>Plagiochila corniculata</i>	A liverwort	Grayson, Smyth Cos	Limited to densely shaded, humid, often fog-enshrouded mountain summits, usually to the spruce-fir association. Most commonly found on Fraser fir.	S	G4?	SNR	-
1	-	X	<i>Plagiochila sullivantii</i> var. <i>sullivantii</i>	A liverwort	Whitetop Mtn, Salt Pond Mtn	Moist shaded rock outcrops, under cliff ledges, in crevices.	S	G2T2	SNR	-
1	X	X	<i>Plagiochila virginica</i>	A liverwort	Bath, Giles, Highland, Roanoke Cos	S. Appalachian endemic. Damp to intermittently dry calcareous or sandstone ledges or cliffs in partially exposed sites.	S	G3	SNR	SNR
7	X	X	<i>Radula tenax</i>	A liverwort	Alleghany, Amherst, Dickenson, Giles, Highland, Nelson, Smyth, Washington Cos	Moist rocks or trees in mountains below spruce-fir zone; Depressed, dense mats on moist rocks, less frequently on tree trunks, in mountainous and hilly regions. Two discrete modes of occurrence: on shaded, damp rocks, and on tree bark in deep, moist forests. Does not tolerate submersion.	S	G3G4	SU	SNR
1	-	X	<i>Sphenolobopsis pearsonii</i>	A liverwort	Mt Rogers & Whitetop Mtn	Bark of Fraser fir, mountain ash, occasionally on red spruce, >5000'.	S	G2	S?	-
Moss										
1	-	X	<i>Sphagnum flavicomans</i>	Northeastern peatmoss	Whitetop Mtn	Bogs, seeps.	S	G3	SU	-
VASCULAR PLANT										
1	-	X	<i>Abies fraseri</i>	Fraser fir	Grayson, Smyth Cos	S. Appalachian endemic. Spruce-fir forests, bogs >5000'	S	G2	S1	SNR
2	X	X	<i>Aconitum reclinatum</i>	Trailing white monkshood	Blue Ridge, Ridge & Valley	Rich cove sites, streambanks, seepages; all with high pH.	S	G3	S3	S3

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
2	-	X	<i>Actaea rubifolia</i>	Appalachian black cohosh	Lower Clinch R watershed, Scott, Wise Cos	Moist, rich wooded bluffs over limestone.	S	G3	S1	-
1	X	X	<i>Allium oxyphilum</i>	Nodding onion	Monroe, Summers, Mercer, Greenbrier Cos, WV	Shale barrens, sandstone glades.	S	G2	S1	S2
1	X	-	<i>Arabis patens</i>	Spreading rockcress	Frederick, Lee, Page, Shenandoah, Warren Cos, VA; Hampshire, Hardy, Pendleton Cos, WV	Shaded, calcareous cliffs, bluffs, and talus slopes.	S	G3	S1	S2
2	X	X	<i>Berberis canadensis</i>	American barberry	Blue Ridge, Ridge & Valley	Calcareous open woods, bluffs, cliffs, and along fencerows.	S	G3	S3S4	S1
1	-	X	<i>Betula uber</i>	Virginia round-leaf birch	One location: Cressy Ck, Smyth Co.	Riparian, mixed open forest, usually disturbed sites.	T	G1Q	S1	-
1	X	-	<i>Boechera serotina</i>	Shale barren rockcress	Ridge & Valley N of James R watershed	Shale barrens and adjacent open oak woods.	E	G2	S2	S2
1	X	-	<i>Boltonia montana</i>	Mountain doll's-daisy	Augusta Co	Sinkhole ponds.	S	G1G2	S1	-
2	-	X	<i>Botrychium jenmanii</i>	Alabama Grapefern	Russell & Wise Cos.	Open woods, old fields, pastures. Formerly: <i>Sceptridium jenmanii</i>	S	G3G4	SH	-
2	X	X	<i>Buckleya distichophylla</i>	Piratebush	Blue Ridge S of Roanoke R, Ridge & Valley S of James R	Open oak and hemlock woods.	S	G3	S2	-
2	-	X	<i>Cardamine clematitidis</i>	Mountain bittercress	Blue Ridge, Ridge & Valley, S of New R watershed	Riparian, spring seeps, rocky streamsides.	S	G3	S1	-
1	X	X	<i>Carex polymorpha</i>	Variable sedge	Blue Ridge, Ridge & Valley, N of James R	Open acid soil, oak-heath woodlands, responds positively to fire.	S	G3	S2	S1
1	X	X	<i>Carex schweinitzii</i>	Schweinitz's sedge	Augusta, Bath, Highland, Montgomery, Pulaski, Washington Cos	Bogs, limestone fens, marl marshes.	S	G3G4	S1	-
1	-	X	<i>Chelone cuthbertii</i>	Cuthbert turtlehead	Blue Ridge Plateau, Grayson, Carroll Cos	Bogs, wet meadows, boggy woods and thickets.	S	G3	S2	-
2	-	X	<i>Cleistesopsis bifaria</i>	Small spreading pogonia	Craig, Dickenson, Scott, Wise Cos	Well drained, rather open, scrubby hillsides, oak-pine-heath woodlands, acidic soils.	S	G4?	S2	S1
1	-	X	<i>Clematis addisonii</i>	Addison's leatherflower	Montgomery, Roanoke, Botetourt, Rockbridge Cos	Open glades & rich woods over limestone and dolostone.	S	G1?	S2	-
1	X	X	<i>Clematis coactilis</i>	Virginia white-haired leatherflower	Ridge & Valley, Rockbridge Co, S to Wythe Co	Shale barrens, rocky calcareous woodlands.	S	G3	S3	-
1	X	-	<i>Clematis viticaulis</i>	Millboro leatherflower	Endemic to VA, only in Bath, Rockbridge Cos.	Shale barrens, open shaly woodlands.	S	G1	S1	-
1	X	X	<i>Corallorhiza bentleyi</i>	Bentley's coralroot	Alleghany, Bath, Giles Cos VA; Monroe, Pocahontas Cos WV	Dry, acid woods, along roadsides, well-shaded trails.	S	G2	S2	S1
2	X	X	<i>Delphinium exaltatum</i>	Tall larkspur	Blue Ridge, Ridge & Valley	Dry calcareous soil in open grassy glades or thin woodlands.	S	G3	S3	S2
1	X	-	<i>Echinodorus tenellus</i>	Dwarf burhead	Pines Chapel Pond, Augusta Co	Pond margins, wet depressions in sandy soil.	S	G5?	S1	-
1	X	X	<i>Echinacea laevigata</i>	Smooth coneflower	Alleghany, Montgomery Cos	Open woodlands and glades over limestone or dolomite.	E	G2G3	S2	-
2	X	X	<i>Euphorbia purpurea</i>	Glade spurge	Blue Ridge, Ridge & Valley	Rich, swampy woods, seeps and thickets.	S	G3	S2	S2
2	X	X	<i>Gaylussacia brachycera</i>	Box huckleberry	Alleghany, Bath, Bland, Carroll, Craig, Dickenson, Montgomery Cos	Dry, acidic forests, woodlands of oaks, pines, and other heaths.	S	G3	S1	S2

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
1	X	X	<i>Gymnocarpium appalachianum</i>	Appalachian oak fern	Alleghany, Augusta, Bath, Highland, Page, Rockbridge, Rockingham, Warren Cos	Maple-birch-hemlock woods on mountain slopes and summits, moist sandstone, talus slopes, or bouldery colluvium. Requires cool, moist microclimate, typically on north-facing slopes with cold air seepage >2000'.	S	G3	S3	S1
1	X	-	<i>Helenium virginicum</i>	Virginia sneezeweed	Endemic to Augusta, Rockingham Cos.	Seasonally dry meadows and sinkhole depressions.	T	G3	S2	-
1	X	-	<i>Helonias bullata</i>	Swamp-pink	Augusta, Nelson Cos	Sphagnum bogs, seeps, and streamsides.	T	G3	S2S3	-
1	X	-	<i>Heuchera alba</i>	White alumroot	Shenandoah Mtn	High elevation rocky woods and bluffs.	S	G2Q	S1	S2
2	X	X	<i>Ilex collina</i>	Long-stalked holly	Blue Ridge, Ridge & Valley	Bogs, seep, shrubby streamheads, >3100'.	S	G3	S1	S2
1	-	X	<i>Iliamna corei</i>	Peter's Mountain-mallow	One location: Narrows, Peters Mountain, Giles Co.	Rich, open woods along sandstone outcrops, soil pockets, fire maintained.	E	G1	S1	-
2	X	X	<i>Isotria medeoloides</i>	Small whorled pogonia	In mountains of VA known only from Bedford, Craig, and Lee Cos; other VA occurrences in Piedmont & Coastal Plain.	Open, mixed hardwood forests on level to gently sloping terrain with north to east aspect.	T	G2?	S2	S1
2	X	X	<i>Juglans cinerea</i>	Butternut	Blue Ridge, Ridge & Valley	Well-drained bottomland and floodplain, rich mesophytic forests, mostly along toeslopes.	S	G4	S3?	S3
2	X	X	<i>Liatris helleri</i>	Turgid gayfeather	Blue Ridge, Ridge & Valley	Shale barrens, mountain hillside openings. <i>L. turgida</i> synonymous with <i>L. helleri</i> .	S	GNR	S3	S2
2	-	X	<i>Lilium grayi</i>	Gray's lily	Blue Ridge, Mt Rogers & Whitetop Mtn (occurrences north of Floyd Co questionable).	Bogs, open seeps, wet meadows, grassy balds.	S	G3	S2	-
2	X	X	<i>Monotropsis odorata</i>	Sweet pinesap	Blue Ridge, Ridge & Valley	Dry oak-pine-heath woodlands, soil usually sandy.	S	G3	S3	S1
2	-	X	<i>Packera millefolium</i>	Piedmont ragwort	Lee, Scott Cos	Open limestone outcrops and cedar barrens.	S	G2	S2	-
1	X	X	<i>Parnassia grandifolia</i>	Largeleaf grass-of-Parnassus	Augusta, Bland, Giles, Grayson, Lee, Montgomery, Russell, Washington, Wythe	Fens, thinly wooded, gravelly seeps over limestone, dolomite, amphibolite, and ultramafic rocks; restricted to calcareous or magnesium-rich soils.	S	G3	S1	-
2	X	-	<i>Paxistima canbyi</i>	Canby's mountain lover	Ridge & Valley, Sarver Barrens SBA, Craig Co	Calcareous cliffs and bluffs, usually undercut by stream.	S	G2	S2	S2
1	X	X	<i>Phemeranthus teretifolius</i>	Quill fameflower	Amherst, Augusta (west side of Blue Ridge, near Laurel Springs Gap, Humpback Mtn SBA), Bedford, Carrol, Craig (Bald Mtn SBA), Grayson, Montgomery, Nelson, Page, Roanoke, Rockingham, Warren Cos, VA; Hardy & Hampshire Cos, WV	Calcareous sandstone glades, metabasalt barrens. Also <i>Talinum teretifolium</i> (Roundleaf fameflower)	S	G4	S4	S1
2	X	X	<i>Phlox buckleyi</i>	Sword-leaf phlox	Blue Ridge, Ridge & Valley	Open, often dry oak woodlands and rocky slopes, usually over shale in humus rich soils, often along roadsides.	S	G2	S2	S2
2	X	X	<i>Poa paludigena</i>	Bog bluegrass	Blue Ridge, Ridge & Valley	Shrub swamps and seeps, usually under shade.	S	G3	S2	S1
1	X	-	<i>Potamogeton hillii</i>	Hill's pondweed	Bath Co	Clear, cold calcareous ponds.	S	G3	S1	-
1	X	-	<i>Potamogeton tennesseensis</i>	Tennessee pondweed	Ridge & Valley	Ponds, back water of streams and rivers.	S	G2G3	S1	S2
1	X	X	<i>Pycnanthemum torrei</i>	Torrey's mountain-mint	Bland, Bath, Giles, Rockbridge, Wythe Cos	Open, dry rocky woods, roadsides, and thickets near streams, heavy clay soil over calcareous rock.	S	G2	S2	S1
1	X	X	<i>Scirpus ancistrochaetus</i>	Northeastern bulrush	Ridge & Valley	Mountain ponds, sinkhole ponds in Shenandoah Valley.	E	G3	S2	S1

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
2	X	X	<i>Scutellaria saxatilis</i>	Rock skullcap	Blue Ridge, Ridge & Valley	Rich, dry to mesic ridgetop woods, 32 counties in VA, likely G4/S4.	S	G3	S3	S2
2	-	X	<i>Silene ovata</i>	Mountain catchfly	Dickenson, Lee, Wise Cos	Rich woodlands and forests over limestone.	S	G3	S1	-
1	-	X	<i>Spiraea virginiana</i>	Virginia spiraea	Blue Ridge, Ridge & Valley, S of New R	Scoured banks of streams, riverside or island shrub thickets.	T	G2	S1	S1
1	X	X	<i>Thermopsis mollis</i>	Soft-haired thermopsis	Amherst, Bath, Bedford, Botetourt, Montgomery, Rockbridge Cos	Dry, open forests, woodlands, and clearings.	S	G3G4	S3	-
1	X	X	<i>Trifolium virginicum</i>	Kate's Mountain clover	Alleghany, Augusta, Bath, Botetourt, Craig, Frederick, Highland, Rockbridge, Rockingham, Shenandoah, Warren Cos	Shale barrens.	S	G3	S3	S3
1	-	X	<i>Tsuga caroliniana</i>	Carolina hemlock	Blue Ridge north to James R.	Rocky ridges and slopes, usually dry and well drained.	S	G3	S3	-
2	X	X	<i>Vitis rupestris</i>	Sand grape	Ridge & Valley	Scoured banks of rivers and streams over calcareous bedrock.	S	G3	S1	S2

LEGEND FOR TES SPECIES LIST IN OCCURRENCE ANALYSIS RESULTS:

OAR CODES:

- 1 = Project located out of known species range.
- 2 = Lack of suitable habitat for species in project area.
- 3 = Habitat present, species was searched for during field survey, but not found.
- 4 = Species occurs in project area, but outside of activity area.
- 5 = Field survey located species in activity area.
- 6 = Species not seen during field survey, but possibly occurs in activity area based on habitat observed; or field survey not conducted when species is recognizable (time of year or time of day). Therefore assume presence and no additional surveys needed.
- 7 = Aquatic species or habitat known or suspected downstream of project/activity area, but outside identified geographic bounds of water resource cumulative effects analysis area (defined as point below which sediment amounts are immeasurable and insignificant).
- 8 = Aquatic species or habitat known or suspected downstream of project/activity area, but inside identified geographic bounds of water resource cumulative effects analysis area.
- 9 = Project occurs in a 6th level watershed included in the USFWS/FS T&E Mussel and Fish Conservation Plan (August 8, 2007 U.S. Fish & Wildlife Service concurrence on updated watersheds). Conservation measures from the USFWS/FS T&E Mussel and Fish Conservation Plan applied.
- 10 = Historic records for this species only; or no known records on GWJ; or species considered extirpated from Virginia/West Virginia.

SPECIES: The term “species” includes any subspecies of fish, wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife, which interbreeds when mature (Endangered Species Act of 1973, as amended through the 100th Congress).

RANGE: The geographical distribution of a species. For use here “range” is expressed as where a species is known or expected to occur on or near the George Washington and Jefferson National Forests in terms of landform (feature name, physiographic province), political boundary (county name), or watershed (river, or stream name).

HABITAT: A place where the physical and biological elements of ecosystems provide a suitable environment and the food, cover and space resources needed for plant and animal livelihood (FSM 2605-91-8, pg. 10 of 13).

TES CODES:

T = Federally listed as Threatened
E = Federally listed as Endangered
P = Federally Proposed as T or E
S = Southern Region (R8) Sensitive species

GLOBAL RANK: Global ranks are assigned by a consensus of the network of natural heritage programs, scientific experts, NatureServe and The Nature Conservancy to designate a rarity rank based on the range-wide status of a species or variety. This system was developed by The Nature Conservancy and is widely used by other agencies and organizations as the best available scientific and objective assessment of taxon rarity and level of threat to its existence. The ranks are assigned after considering a suite of factors including number of occurrences, numbers of individuals, and severity of threats.

G1 = Extremely rare and critically imperiled with 5 or fewer occurrences or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G2 = Very rare and imperiled with 6 to 20 occurrences or few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range; or vulnerable to extinction because of other factors. Usually fewer than 100 occurrences are documented.

G4 = Common and apparently secure globally, although it may be rare in parts of its range, especially at the periphery.

G5 = Very common and demonstrably secure globally, although it may be rare in parts of its range, especially at the periphery.

GH = Formally part of the world’s biota with the exception that may be rediscovered.

GX = Believed extinct throughout its range with virtually no likelihood of rediscovery.

GU = Possibly rare, but status uncertain and more data needed.

G? = Unranked, or, if following a ranking, ranking uncertain (ex. G3?).

G_Q = Taxon has a questionable taxonomic assignment, such as G3Q.

G_T = Signifies the rank of a subspecies or variety. For example, a G5T1 would apply to a subspecies of a species that is demonstrably secure globally (G5) but the subspecies warrants a rank of T1, critically imperiled.

STATE RANK: The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources (NHRs) are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The criterion for ranking NHRs is the number of populations or occurrences, i.e. the number of known distinct localities; the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals; the quality of the occurrences, the number of protected occurrences; and threats.

- **S1** - Extremely rare; usually 5 or fewer populations or occurrences in the state; or may be a few remaining individuals; often especially vulnerable to extirpation.
- **S2** - Very rare; usually between 6 and 20 populations or occurrences; or with many individuals in fewer occurrences; often susceptible to becoming extirpated.

- **S3** - Rare to uncommon; usually between 21 and 100 populations or occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
- **S4** - Common; usually >100 populations or occurrences, but may be fewer with many large populations; may be restricted to only a portion of the state; usually not susceptible to immediate threats.
- **S5** - Very common; demonstrably secure under present conditions.
- **SA** - Accidental in the state.
- **S#B** - Breeding status of an organism within the state.
- **SH** - Historically known from the state, but not verified for an extended period, usually > 15 years; this rank is used primarily when inventory has been attempted recently.
- **S#N** - Non-breeding status within the state. Usually applied to winter resident species.
- **SR** – Reported for Virginia, but without persuasive documentation that would provide a basis for either accepting or rejecting the report.
- **SU** - Status uncertain, often because of low search effort or cryptic nature of the element.
- **SX** - Apparently extirpated from the state.
- **SZ** - Long distance migrant, whose occurrences during migration are too irregular, transitory and/or dispersed to be reliably identified, mapped and protected.
- **NA** – Not Applicable- A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

These ranks should not be interpreted as legal designations.